

Worksheet 2-7: Exponent Law Review

Exponent Law 1) $x^m \times x^n =$ _____

Exponent Law 4) $x^0 =$ _____

Exponent Law 2) $x^m \div x^n =$ _____

Exponent Law 5) $x^1 =$ _____

Exponent Law 3) $(x^m)^n =$ _____

Exponent Law 6) $x^{-n} =$ _____

Order of Simplifying Expressions with Powers

1. Follow **BEDMAS**.
2. Use the **first** three laws to simplify expressions as a single power. (**Exponent Laws 1 to 3**)
3. Use **Exponent Law 6** to simplify single powers into powers with only positive exponents.
4. Use the **Exponent Laws 4 and 5** to evaluate.
5. Use your **scientific calculator** to evaluate.

1. Simplify as single powers with positive exponents, then evaluate

(a) $\frac{(9^{-1})^6 \times (9^{-3})^0}{(9^{-2})^6}$

(b) $(-3)^{-6} \times ((-3)^{-1})^{-2} \div (-3)^{-3}$

(c) $\frac{(2^{43})^0 \times (2^{-3})^{-2}}{2^4 \times 2^{-1}}$

(d) $9^{-2} + (3^2 \times 3^{-6}) - 81^{-1}$

Exponent Laws for Power of a Fraction

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$\left(-\frac{a}{b}\right)^n = \frac{(-a)^n}{b^n} \text{ or } \frac{a^n}{(-b)^n}$$

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n = \frac{b^n}{a^n}$$

2. Write with positive exponents *where applicable*, then evaluate.

(a) $\left(\frac{1}{2}\right)^3$

(b) $\left(\frac{2}{3}\right)^4$

(c) $\left(\frac{1}{2}\right)^{-3}$

(d) $\left(-\frac{1}{5}\right)^{-3}$

3. Simplify then evaluate. Answer as a fraction.

(a) $-\left(-\frac{3}{4}\right)^2$

(b) $\left(-\frac{2}{5}\right)^{-2}$

Answers: 1. (a) 9^6 , 531441, (b) $(-3)^{-1} = \frac{1}{(-3)^1}$, $-\frac{1}{3}$, (c) 2^3 , 8, (d) $\frac{1}{9^2} + \frac{1}{3^4} - \frac{1}{81} = \frac{1}{81}$;

2. (a) $\frac{1}{8}$, (b) $\frac{16}{81}$, (c) 2^3 , 8, (d) $(-5)^3$, -125 ; 3. (a) $-\frac{9}{16}$, (b) $\left(-\frac{5}{2}\right)^2$, $\frac{25}{4}$ or $6\frac{1}{4}$.

Power Bingo Review

Instructions: (1) For the following bingo grid, write numbers 1-9 **randomly** in the small boxes.

(2) According to the question numbers, write answers in corresponding bingo grid box.

For the following, express as a “single power” with positive exponents and then “evaluate”:

1. $3^6 \times 3^{-4}$

2. $2^{10} \div 2^7$

3. $((-4)^{-1})^{-3}$

$$4. \frac{10^{23} \times 10^{-21}}{10^{-3}}$$

$$5. \frac{(2^0)^{65} \times 2^7}{(2^2)^3}$$

6. $4^{-2} + (2^2 \times 2^{-6})$

$$7. -2^3 + (2^2)^5 - 2^{-1}$$

8. $(x^{-1})^0$

9. $((y^{-2})^{-5})^{-1}$

[illegible]